GRASP versatile algorithm: utilization in polarimetric remote sensing applications

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Polarimetric observations especially those by multi-angular imagers are widely considered as advanced measurements that can provide most of sought information about global and regional properties of aerosol. Indeed, the addition of polarimetric measurements of atmospheric radiation clearly maximize the sensitivity of observations to detailed aerosol properties. Nevertheless, the overall volume of polarimetric observations of the atmosphere remains small compared to that of intensity-only observations. Furthermore, the currently available polarimetric observations are mostly considered as useful data sets for understanding the potential of polarimetry and for designing future missions rather than as a source of aerosol information for specific climatological and environmental applications. This situation is undoubtedly the result of the general complexity of polarimetric observations and the retrieval theory and as well of lack of actuation polarimetric data sets. Polarimetry is highly sensitive to a large number of atmospheric parameters, and accounting adequately for all these sensitivities in the retrieval algorithm is very demanding, especially in satellite applications where large volumes of data are to be processed. Therefore, the need to develop more robust algorithms for deriving aerosol properties from polarimetry has been clearly identified by the satellite community. As a result, recently several highly optimized algorithms have been developed and demonstrated to provide enhanced aerosol retrievals from satellite polarimetry [1].

The main objective of this presentation is to discuss the potential of recently developed GRASP algorithm [2,3] for polarimetric remote sensing. The application of GRASP to the observations of POLDER, 3MI, GCOM-C/SGLI imagers as well as to data sets combining coordinated lidar and polarimetric imagers will be illustrated and discussed.

References

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